


Take Test: Quiz 6.1. Introduction to RKHS

 **Test Information**

Description

Instructions

Multiple Attempts This test allows multiple attempts.

Force Completion This test can be saved and resumed later.

Your answers are saved automatically.

QUESTION 1

0.2 points

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- Why do we need nonlinear extensions to the linear algorithms
- ☐ To provide the user wit an alternative formulation.
 - ☒ To be able to learn the nonlinear behaviour of observable phenomena.
 - ☐ To make regression algorithms more powerful.
 - ☐ To make classification algorithms faster.

QUESTION 2

0.2 points

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- What is a general approach top provide an algorithm with nonlinear properties?
- ☐ Transforming the input pattern \mathbf{x} using a nonlinear transformation.
 - ☐ Using a Volterra expansion of the data.
 - ☒ Transforming the input pattern \mathbf{x} into a higher dimensional space using a nonlinear transformation of its components.
 - ☐ Applying a polynomial to the input pattern \mathbf{x}

QUESTION 3

0.2 points

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- What is the curse of dimensionality?
- ☐ The curse of dimensionality is an unavoidable increase of the complexity of nonlinear learning machines .
 - ☐ The curse of dimensionality does not really exist unless the transformation is polynomial with a high order, in which case, the dimensionality of the corresponding space increases polynomially.
 - ☒ If we want to add nonlinear properties to the data using a nonlinear transformation of the input space, the corresponding feature space has a dimension that increases with the degree of nonlinearity.
 - ☐ If the dimension of the input and the output of our learning machine are too high, then the machine has high complexity.

QUESTION 4

0.2 points

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- Which one is an interpretation of the Representer theorem.
- ☒ All answers are correct.
 - ☐ Under some conditions, the estimator is a linear combination of dot products between the training and the test data.
 - ☐ If the criterion for the optimization of the data contains a convex loss and a nonnegative function of the weight vector norm, then the weight vector norm is a linear function of the training data.
 - ☐ The estimator can be constructed as a dot product between the weight vector and the test data into the Hilbert space, or equivalently as a linear combination of dot products between training and test data in the Hilbert space, if certain conditions are satisfied.

QUESTION 5

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- The curse of dimensionality can be avoided
- ☐ if the estimator is constructed under the conditions of the Representer Theorem. In that case, the curse of dimensionality does not exist.
 - ☐ if the estimator is constructed under the conditions of the Representer Theorem, which consists of using a nonlinear representation that transforms the data into a dual space, and a convex cost function.
 - ☐ if the estimator is constructed under the conditions of the Representer Theorem. In that case, the estimator can be constructed in a dual space whose dimension is constant.
 - ☒ if the estimator is constructed under the conditions of the Representer Theorem. In that case, the estimator can be constructed in a dual space whose dimension is equal to or less than the total number of training data.